

1 ELECTRIC POWER CONNECTION STRUCTURE OF A DIRECT CURRENT MOTOR

Background of the Invention

1. Field of the Invention

5 The present invention relates to an electric power connection
6 structure of a direct current motor, and more particularly to an electric power
7 connection structure of a direct current motor, wherein the connection circuit
8 of the electric power may be positioned conveniently, and cannot be torn out.

9 2. Description of the Related Art

10 A first conventional heatsink fan 90 having a direct current motor in
11 accordance with the prior art shown in Fig. 6 comprises a power cord 92 which
12 is connected to a stator coil 91, reeved through a frame 93 of a housing and a
13 baffle 94, and is then drawn out. Thus, the frame 93 and the baffle 94 may
14 absorb the external pulling force to the power cord 92 outside of the frame 93,
15 thereby preventing the power cord 92 from being pulled to detach from the
16 stator coil 91.

17 A second conventional heatsink fan 80 in accordance with the prior
18 art shown in Figs. 7 and 8 comprises a power cord 82 which is connected to a
19 stator coil 81, is pressed by a press rod 84 of a cover plate 83, is reeved through
20 the wall 85 of a housing, and is then drawn out. Thus, the press rod 84 and the
21 wall 85 of the housing may absorb the external pulling force to the power cord
22 82 outside of the housing of the heatsink fan 80, thereby preventing the power
23 cord 82 from being pulled to detach from the stator coil 81.

24 In the above-mentioned conventional heatsink fan which uses a
25 direct current motor, the connection design of the power cord mainly uses tiny
26 cords that are protruded outward from the frame to connect the electric power.
27 Thus, the frame 93 and the baffle 94 or the press rod 84 and the wall 85 of the

1 housing may absorb the external pulling force on the power cord, thereby
2 preventing the power cord from being pulled to detach from the stator coil.
3 However, the conventional heatsink fan using a direct current motor has to
4 prevent the power cord from being pulled to detach from the stator coil, so that
5 the fabrication of the conventional heatsink fan is inconvenient. In addition,
6 the electric cords are protruded outward from the frame to connect the electric
7 power, thereby decreasing the aesthetic quality of the conventional heatsink
8 fan.

9 **Summary of the Invention**

10 The primary objective of the present invention is to provide an
11 electric power connection structure of a direct current motor, wherein the
12 electric power connection structure may be processed and manufactured
13 conveniently, and the connection circuit of the electric power may be
14 positioned conveniently, and cannot be torn out.

15 In accordance with the present invention, there is provided an
16 electric power connection structure of a direct current motor, wherein the outer
17 wall of the motor housing is provided with a power plate which is provided
18 with connection terminals and connection circuits. The connection circuit has a
19 first end formed with a connection terminal that may be connected to an
20 electric power for driving the motor to rotate, and a second end electrically
21 connected to an drive circuit that may control the motor to start and rotate.

22 Further benefits and advantages of the present invention will become
23 apparent after a careful reading of the detailed description with appropriate
24 reference to the accompanying drawings.

25 **Brief Description of the Drawings**

26 Fig. 1 is an exploded perspective view in accordance with a first
27 embodiment of the present invention;

1 Fig. 2 is a perspective assembly view in accordance with the first
2 embodiment of the present invention;

3 Fig. 3 is a cross-sectional view taken along line 3-3 as shown in Fig.
4 2;

5 Fig. 4 is an exploded perspective view in accordance with a second
6 embodiment of the present invention;

7 Fig. 5 is a perspective assembly view in accordance with the second
8 embodiment of the present invention;

9 Fig. 6 is a cross-sectional assembly view of a first conventional
10 motor in accordance with the prior art;

11 Fig. 7 is a top plan assembly view of a second conventional motor in
12 accordance with the prior art; and

13 Fig. 8 is a cross-sectional view taken along line 8-8 as shown in Fig.
14 7.

15 **Detailed Description of the Preferred Embodiments**

16 Referring to the drawings and initially to Fig. 1, a direct current
17 motor 1 in accordance with a first embodiment of the present invention
18 comprises a housing 10 having a bottom board 11 provided with a shaft seat 12
19 combined with a shaft tube 14 of a stator 13. A rotor 15 has a rotation shaft 16
20 rotatably mounted in the shaft tube 14. The housing 10 has an outer wall
21 provided with a power plate 2. The power plate 2 includes connection circuits
22 21. The connection circuit 21 has a first end formed with a connection terminal
23 22 that may be connected to the electric power, and a second end electrically
24 connected to a circuit board 131 (see Fig. 3) that has an drive circuit. In the
25 preferred embodiment, the power plate 2 and the circuit board 131 of the
26 present invention may be formed by the same film printed circuit. In addition,
27 the outer wall of the housing 10 may be provided with an insertion groove 17

1 so that the power plate 2 may be inserted into and positioned in the insertion
2 groove 17. If necessary, the bottom board 11 of the housing 10 has an annular
3 wall 111 which is provided with a cutout 112 for passage of the connection
4 circuit 21.

5 Referring to Figs. 2 and 3, the direct current motor 1 in accordance
6 with the first embodiment of the present invention is assembled. The circuit
7 board 131 of the motor 1 is connected with the connection circuit 21 of the
8 power plate 2 which is passed through the cutout 112 of the bottom board 11 of
9 the housing 10. The power plate 2 may be inserted into and positioned in the
10 insertion groove 17 of the housing 10. The connection terminal 22 of the power
H1 plate 2 may be connected to the electric power. Thus, the circuit board 131
H2 having an drive circuit may be electrically connected to the connection circuit
H3 21 of the power plate 2, and power plate 2 may be inserted into and positioned
H4 in the insertion groove 17 of the housing 10. Thus, the motor 1 does not have
H5 electric cords that are protruded outward from the housing 10, and does not
H6 have electric cords that are detached due to a pulling force.

7 Referring to Fig. 4, a direct current motor 4 in accordance with a
H8 second embodiment of the present invention comprises a housing 40 provided
19 with a shaft seat 42. A rotor 42 has a rotation shaft 43 having a first end
20 rotatably mounted in the shaft seat 41, and a second end pivoted on a cover
21 plate 44. The wall of the housing has an annular groove 45 for receiving a film
22 printed circuit 5. The film printed circuit 5 is protruded with a power plate 50,
23 and is provided with multiple coils 51 and a sensing drive member (not shown).
24 The power plate 50 is provided with connection terminals 22 that may be
25 connected to the electric power. The power plate 50 is protruded outward from
26 the annular groove 45, and is bent and bonded on the outer wall of the housing
27 40. In the preferred embodiment, the outer wall of the housing 40 may be

1 provided with an insertion groove 46 so that the power plate 50 may be
2 inserted into and positioned in the insertion groove 46.

3 Referring to Fig. 5, the direct current motor in accordance with the
4 second embodiment of the present invention is assembled. The film printed
5 circuit 5 is mounted in the annular groove 45 of the housing 40, and the power
6 plate 50 is inserted into and positioned in the insertion groove 46 of the
7 housing 40, and the connection terminal 22 of the power plate 50 may be
8 connected to the electric power. Thus, the motor 4 does not have electric cords
9 that are protruded outward from the housing 40, and does not have electric
10 cords that are detached due to a pulling force.

11 Accordingly, the direct current motor or the heatsink fan using the
12 direct current motor does not have electric cords that are protruded outward
13 from the housing, and does not have electric cords that are detached due to a
14 pulling force. Thus, the poor quality of fabrication of the direct current motor
15 may be reduced, and the outer appearance of the direct current motor may be
16 simpler and more beautiful. In addition, the direct current motor or the heatsink
17 fan is convenient in use and storage.

18 Although the invention has been explained in relation to its preferred
19 embodiment as mentioned above, it is to be understood that many other
20 possible modifications and variations can be made without departing from the
21 scope of the present invention. It is, therefore, contemplated that the appended
22 claim or claims will cover such modifications and variations that fall within the
23 true scope of the invention.